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POLLUTION-CAUSED FISH KILLS IN 1962

Public Health Service
Washington, D.C.

1962

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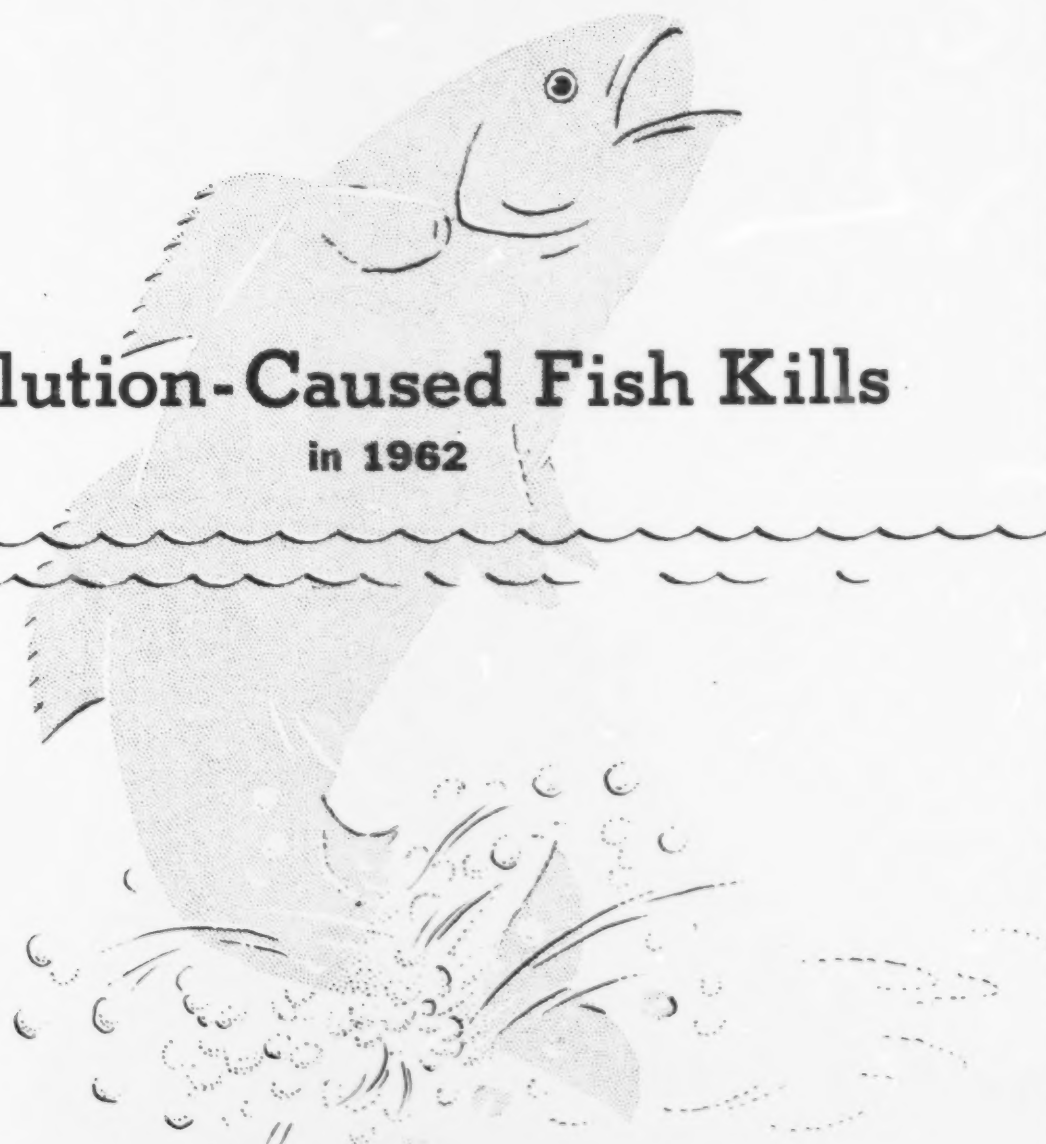
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Pollution-Caused Fish Kills

in 1962

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U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE

Public Health Service

Public Health Service Publication No. 847
(1962 Edition)

Pollution-Caused Fish Kills In 1962

**U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
Public Health Service
Division of Water Supply and Pollution Control
Basic Data Branch
Washington 25, D.C.**

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INTRODUCTION

This publication is the third annual report of fish kills caused by pollution occurring in the United States. The reporting of pollution-caused fish kills was begun by the Public Health Service in the Spring of 1960 in an effort to secure additional information on the effects of pollution in the Nation's waters, to elicit the cooperation and assistance of conservation groups in the States to help determine causes of fish kills and assist in their abatement, and to place responsibility for fish kills where it belonged.

The Surgeon General asked all State conservation and fish and game agencies to assist him by reporting instances of fish kills attributable to pollutants entering the streams or lakes of the Nation. A self-addressed postcard reporting form was devised in cooperation with the U.S. Fish and Wildlife Service and the various independent conservation organizations. The form, shown in this publication as figure 1, was furnished to the State agencies to be completed as occasions arose and mailed to the Public Health Service. Summary totals and statistical evaluations and conclusions are based upon the information contained in these reporting forms.

The fish kill activity has just completed its third year of operation. As it matures and as the reporting authorities in the States become accustomed to furnishing more complete information about each kill, the resulting publications will undoubtedly become more meaningful, and serve as a more useful tool in helping to identify and abate pollution.

In 1962, a semi-annual report was published listing reported fish kills for the period January-June, 1962. This present report includes all fish kills in 1962 which were reported by the various State agencies. Even though the resulting totals of fish killed are large, they probably represent

only a fraction of fish actually killed throughout the United States by man-made pollution.

In an effort to make the reporting of these fish kills more accurate and hence the published summaries more useful and effective, it was found desirable to revise portions of the postcard reporting form. Beginning in January 1963, the revised form was put into use throughout the States and future summaries will indicate more accurately the source of pollution believed to have killed the fish. Most pollution-caused fish kills are attributable to operational activities. The revised reporting form on which next year's publication will be based indicates four principal operations causing the majority of fish kills: agricultural, industrial, municipal, and transportation operations, with appropriate subheadings. When classified in this manner, the responsibility for causing fish kills can be more accurately defined.

As the reporting forms are received from the States, copies are furnished to the U.S. Fish and Wildlife Service. Reports were excluded from the listing if it was apparent that the kill was not related to pollution. Lack of sufficient dissolved oxygen in the water from natural biological activity will kill fish, but is not necessarily related to man-made pollution. Some reports indicated kills had occurred too far in the past to determine the cause or extent. Other reports stated that pollution occurred but no fish were killed, and some referred to shellfish which died of causes not related to pollution. Of the total reports received, however, only a small number are excluded from the summary.

Acceptable reports are coded for machine punch card tabulation so that various statistical tables can be obtained. The punch card method permits the insertion of late reports in the sequence in which they occurred.

DEPARTMENT OF
HEALTH, EDUCATION, AND WELFARE
PUBLIC HEALTH SERVICE

(WASHINGTON USE)

Form Approved: Budget Bureau No. 68-R706

REPORT OF POLLUTION-CAUSED FISH KILL

1. LOCATION:
Stream or Lake
Nearest Town State
2. DATE OF KILL:
3. TYPE WATER: ☐ Fresh ☐ Salt ☐ Estuary
4. SOURCE OF POLLUTION:
☐ Mining Operations ☐ Agricultural Poisons ☐ Domestic Sewage
☐ Industrial Wastes ☐ Other ☐ Unknown
Specific cause if known
5. TYPE OF FISH KILLED
..... % Game
..... % Forage
..... % Rough or Trash
100%
6. ESTIMATED NUMBER KILLED
7. SEVERITY:
☐ Total ☐ Heavy ☐ Moderate ☐ Light
8. EXTENT: Miles of stream or acres of lake affected
9. DURATION OF CRITICAL EFFECT: days hrs.

(Fold Here)

10. SIGNIFICANT CHANGES IN AQUATIC FOOD ORGANISMS
11. CORRECTIVE ACTION NEEDED
12. COMMENTS

REPORTING OFFICIAL	AGENCY MAILING ADDRESS	DATE

FIGURE I

POLLUTIONAL SIGNIFICANCE

The reporting and listing of fish kills caused by pollution is admittedly only a rough measure of the pollution itself. The principal fact to be gained is that a sufficient quantity of the pollutant was added to cause death of fish. There is, of course, a marked economic effect on the sport fisheries industry as well as on commercial fishing interests by the unnecessary death of millions of fish each year. But the fish kill reports do not take into account the effects of sub-lethal yet harmful quantities of pollutants discharged to surface waters which may also affect the aquatic

food organisms supporting fish life, nor the effects of pollutants causing fish flesh tainting, thus rendering it unpalatable for human consumption.

Conservation organizations have expressed to the Public Health Service an interest in developing a system for reporting information on surface waters adversely affecting odors or tastes in fish flesh. Commercial fishing has been severely curtailed or ruined in areas where certain pollutants have caused off-flavors or odors in fish. The Public Health Service is interested in this problem, even though recognizing that the estab-

ishment of a standardized system of reporting would be quite difficult. It would seem that such an effort would have to be independent of the fish kill reporting activity, and studies are under consideration to determine the feasibility of initiating an effort in this direction.

Some pollution-caused fish kills have public health implications, particularly if the residual substances causing the fish deaths go through a water treatment plant unchanged and subsequently are consumed by the public (as in the case of some synthetic organic liquid wastes), but in others the health significance may be

obscure. Identifying a specific toxic substance may be an involved and frequently impossible procedure. The policy has been, however, to accept the opinion of the State agency representative and to list the information submitted as being the considered judgment of the initiating State agency.

With hundreds of representatives reporting, from fish and game inspectors to professional aquatic biologists, the details of the reports do vary widely; but, as a whole, they represent a careful effort on the part of many dedicated public servants.

EXTENT OF COVERAGE

Reported fish kills included in this summary come from 38 States¹ and the District of Columbia, a decrease of 6 from the 45 States which reported fish kills in 1961. It would be a significant achievement in the control of water pollution if it were possible to say conclusively that the lack of fish kills in 12 States were attributable to a dramatic decrease in the quantities of polluting substances discharged to the surface waters in those States. The more probable explanation, however, is that fish kills which did occur went unobserved or possibly in some cases unreported. In some States, extensive efforts are made to collect reports on all fish kills. A casual examination of the numbers of reports contained under the State headings illustrates this fact. In others,

¹ Reports from two of these States, Delaware and Utah, were received too late to be included in tabular analyses.

this information is developed only when there is a legal prosecution for a fish kill. Not all States have the same area or quantities of surface water. Population densities and industrial and agricultural activities, all of which affect water quality, differ from State to State.

States not reporting any fish kills are: Alaska, Hawaii, Maryland, Mississippi, Nevada, New Hampshire, New Mexico, North Dakota, Oklahoma, South Carolina, South Dakota, and Vermont. These States have indicated that either no known fish kills occurred, were insignificant in size, or were not reported for other reasons. No State has been asked to modify its existing methods of self-notification, but only to pass on to the Public Health Service such information about fish kills as was developed in connection with its normal operating procedures.

EXCEPTIONALLY LARGE FISH KILLS

During 1962, two exceptionally large fish kills occurred, involving several million fish each. One of these fish kills involved an estimated 37,800,000 anchovies off the coast of California near the San Diego Harbor entrance and is the largest single fish kill that has been reported to the Public Health Service. Although contained in the listing, *this number has been omitted from all summary tabulations* since its very size would tend to obscure any conclusions that otherwise might be obtained from the data for the rest of the United States. The other kill occurred in the Anacostia River near Washington, D.C. Details of these fish kills were thought to be of general interest to the readers of this publication.

Pacific Coastal Waters near San Diego Harbor Entrance. Mr. John F. Janssen, Manager, Region 5, California Department of Fish and Game, supplied the details of this kill.

A report was received on August 23, 1962, that a heavy fish kill had occurred east of the North Island jetty at the San Diego Harbor entrance. A game warden had investigated the kill and found dead anchovies in large deposits on the North Island Beach, the largest of which was about a quarter of a mile long and averaging some 3 feet in depth. Tests were made for dissolved oxygen at a 7-foot depth, one-half mile east of the jetty and 1 mile south of the North Island Beach. Dissolved oxygen was 6.7 ppm, only

slightly below saturation. At the same point there was a large amount of gray flocculent material floating in the water close to the surface. Moving from this area eastward there was a noticeable increase in density of the particulate matter merging into streaks on the surface. The entire area appeared to be covered uniformly with a thin layer of clear, oily material.

About two miles seaward a large crescent-shaped area one-half mile long by one-eighth mile wide was covered with oily buff colored material to a depth of one-half to 1 inch which had the appearance, feel, and smell of paint. A sample was taken for analysis.

Measurements of the dead fish deposit were 1,000 feet by 10 feet wide, with an average depth of 3 feet. At 63 pounds per cubic foot and 20 fish per pound, this amounts to 945 tons or about 37,800,000 fish.

Chemical analysis of the oily paint-like material revealed that it was indeed a fish oil, filtered and winterized and containing no vitamin A. Such oils are processed and not the same as raw oil. The particulate matter mixed in with the oil was found to be a clay-like material such as is used in filtration of oils. Volatile hydrocarbons such as light mineral spirits were found mixed with the oil.

The large amount of fish oil on the water surface was undoubtedly the cause of this fish kill. This particular oil contained light mineral spirits which are known to be toxic to fish. The shallow water area in which this kill occurred normally contains an abundant supply of anchovies and is extensively used by live-bait fishermen.

There appeared to be no sound reason for dump-

ing this oil in such large quantities. Nearly all winterized fish oils are used in paint manufacture and the quantity that was dumped could easily have been salvaged even when mixed with the filter clay. Even after extensive investigation the source of the material remains unknown.

Anacostia River near Washington, D.C.

On or about September 20, 1962, approximately 3,180,000 fish were killed in the Anacostia River near Washington, D.C. At the request of the Water Supply and Pollution Abatement Committee of the Metropolitan Washington Council of Governments, a special investigating committee of the Regional Sanitary Advisory Board made an investigation of the circumstances surrounding this fish kill. The investigating committee found that the extremely heavy fish kill appeared to have been caused primarily by the discharge of greater than usual volumes of raw sewage, coupled with the presence of algae blooms. About 40 million gallons of raw sewage were dumped into the river briefly in mid-September during an interruption in the sewerage system by construction of the Anacostia Freeway.

The size of the Anacostia kill was probably due to the chance and coincidental migration downstream of a school of alewives or branch herring. These are a type that go upstream in March from salt to fresh water to spawn. The young migrate downstream through December to return to salt water. Chances are that there would have been only a small kill if this school had not chosen the same time to migrate as the District chose to bypass additional raw sewage.

THE DATA

Fish Kill Totals. During the twelve months of 1962, 36 States¹ and the District of Columbia submitted 381 notifications of pollution-caused fish kills. (See table 1.) This number does not include one report of the exceptionally large kill in Pacific coastal waters discussed in the preceding section. This kill is shown in the individual listings at the end of the report, but is excluded from all summary tabulations.

Of the 381 usable notifications, 233 indicated the number of fish killed. The remainder, if not left blank, reported "many," "several thousand," or gave a figure in pounds or some other unquantifiable indication. These 148 reports are shown in the Cumulative Listing but in the column "Estima-

ted number of fish killed" this item is left blank.

While the number killed is at best only an estimate, the number is used as reported without any attempt at rounding. *No artificial degree of accuracy is implied by this procedure.* It does, however, avoid the troublesome problem of balancing rounded figures between tables.

A total of nearly 6,200,000 fish were reported killed in the 233 instances where a number was given. As reported by 259 notifications, there were 1,448 miles of river affected, 25 miles of lake and bay shore and 2,581 acres of lakes, bays, and reservoirs. Of this category, there was one report covering 1,920 acres of Lake Ponchartrain in Louisiana.

¹ See footnote 1, page 3.

Source of Pollution. Of the 381 reports, 308, or 81 percent, were able to indicate the source of the pollutant. As will be seen in table 2, industrial wastes had the largest number, 163, or 53 percent of the known sources and over three times as many as the next highest category which was agricultural poisons. Since the reporting began in 1960, the relative positions of categories in numbers of reports have not changed.

In numbers of fish reported killed, domestic sewage had the highest of over 3¼ million; however, a single kill, discussed above, accounted for more than 3 million fish. Agricultural poisons had the lowest number, slightly over 91 thousand.

The average size of kills decreased about 13 percent, from 6,500 in 1960 to 5,700. The individual category average varied from 54 percent to 200 percent of the previous year. See table 3. These averages are derived after 11 reports of over 100,000 killed were removed. They were then applied to those reports not giving a number and added to the total number that were reported. On this basis the derived estimated number of fish killed represented by all 381 reports is 7,118,000.

Types of Fish Killed. Eighty-three percent of the reports gave an estimated percentage distribution of the kill among three types of fish: game, forage, and rough or trash fish. Matching percentages against the number of fish, it would appear, from table 4, that about one-fourth of the fish represented by the 381 kills were game fish, two thirds were forage fish and one-tenth were rough or trash fish.

When applied to the estimated total, it would appear that of the total 7,118,000 estimated killed, 1,769,000 were game fish, 4,704,000 were forage fish and 645,000 were rough or trash fish. Table 5 also shows comparable distribution for each pollution source. Some comment should perhaps be made regarding the distribution for domestic sewage. The figures shown were derived as stated. There is, however, some distortion introduced here by the aforementioned large kill of 3,180,000. The original report did not give a percentage distribution by type, but notations on

the card plus knowledge of the locale would indicate that none of the kill was game fish type. Adjusting for this, the distribution for domestic sewage would read approximately 32,000 game, 3,262,000 forage, and 168,000 rough or trash fish.

Type of Water Body. As might be expected, most of the kills were in rivers, 85 percent or 324 of the 381 reports (table 6). Of the kills in rivers, 197 reported 5.8 million of the 6.2 million fish. The 259 giving mileage reported 1,448 miles affected, an average of 5.6 miles per kill. The 1961 average on 1,686 miles was 7.0 miles. The remaining 400,000 fish killed in 1962 were in 2,581 acres of lake and bay area and along 25 miles of shore line.

Except for the very large kill near San Diego, all but 294,000 were killed in fresh water (table 7).

Other Data. One question on the reporting form asked whether the respondent believed there was a significant change in aquatic food organisms. One hundred forty gave an opinion: 80 gave an affirmative answer, 60 replied in the negative. While only 37 percent of the reports gave a definite response, this rate of reply is 61 percent better than a year ago. The replies by source of pollution are shown in table 8.

Another item provided the respondent an opportunity to outline corrective action. One hundred forty-eight stated what they thought should be done (table 9), while 13 stated that no action was needed. Usually this meant that action had already been completed.

While only 61 percent of the respondents gave an estimate of the number of fish killed, 94 percent expressed an opinion as to the severity. That is, whether the kill was total, heavy, moderate, or light. A distribution of these replies is shown in table 10.

In addition to indicating the source of pollution, respondents were asked to name the specific causative agent if known. See table 11. Of the 381 reports 63 percent carried such an indication. This is an improvement in reply over last year. Tables 12 through 16 carry other data relating to this report.

EVALUATION OF REPORTING

In an attempt to measure its quality, the reporting was examined as to its completeness. That is, whether a definite response was given. The

upper portion of table 17 shows the percentage of reports which gave answers to specific questions. These percentages were compared with the per-

centages in 1961. When the percentage in 1962 divided by the percentage in 1961 results in a value of over 100, an improvement is indicated over the previous year. A value of less than 100 indicates a decrease in completeness. These ratios are shown in the lower half of table 17. In nearly all cases

the losses shown last year are offset by gains this year and vice versa. Overall in 1961, 65.6 percent of possible replies were definite responses. In 1962 the percentage was 65.7 percent. Therefore, there is neither gain nor loss in overall degree of reporting.

COMMENTS OF STATE AGENCIES

It has become a practice in this publication to include a sampling of comments contained on the reporting forms which elaborate on the circumstances of the fish kills. These comments are most pertinent and necessary to identify the real or suspected source of pollution, the action if any to correct the causes, and the significance to the aquatic life in the stream. The revised reporting form put into use on January 1, 1963, provides more space for comments to clarify the conditions of the fish kills. Comments by fish and game inspectors and aquatic biologists alike show the seriousness with which these kills are taken. Those appearing below are in most cases direct quotes from the reporting forms.

The rupture of the discharge line allowed great quantities of sulfite waste liquor to be discharged to the estuary. BOD loading was sufficient to reduce dissolved oxygen levels below that necessary to sustain all forms of fish life.

Overflow of irrigation water from treated cotton field was cause of kill. Cotton was sprayed with a solution containing 40 percent toxaphene, 20 percent DDT and 5 percent methyl parathion. Also with endrin and 7½ percent 1-Naphthyl-N-methyl-carbamate dust.

Crop dusting company poisoned cotton for the State and on finishing a trip across the cotton field they pulled up over this lake and must have dropped some into the water. Lots of bass and white crappie, a few catfish, and thousands of shad, some buffalo, and carp lined both banks.

This kill occurs almost every summer when water levels are low. The source is ----- Dye Works. The pollution is year round, but reaches lethal dosages with low water levels. Pollution consists of large quantities of detergents, and some waterproofing compounds—nearly all organic.

Cotton poisons were used extensively for 2 days, prior to heavy rainfall in excess of 3 inches. Quick runoff washed cotton poison into stream resulting in a total kill.

Kill caused by damaged septic tank containing wastes from garbage cooker located at piggeries on State Epileptic grounds. Water supply was affected. Stream was black and smelled like an open sewer. Stream conditions were improved some by flooding the stream with another source of water supply.

Fish killed by hot water. Power plant empties hot water into stream and stream was low due to prolonged hot dry spell.

Caused by blown fuse on motor pumping plant effluent from settling pool to hilltop spray. Pool overflowed.

Bait fish and fish bait killed. Crayfish were crawling out on the banks and stumps so thick that some driftwood was completely covered. This pollution is a yearly occurrence. Sewage disposal plant water loaded with bacteria goes into slow moving stream. Heavy rains take it to Conewango Creek which is stocked with channel catfish. After water runs over a small dam it picks up enough turbulence to restore oxygen so no dead fish are found below this point.

Caused by chemicals used to flush lines of power plant. Lagoon overflowed. Some of the chemicals were sodium nitrite, ammonium bifluoride, flake spec 104, hydrazine, and soda ash, plus several unknowns.

Outfall from paper mill containing lignite. When the wind comes from northeast or east, the outfall from paper company is concentrated in cover and acts as a trap for fish, due to lack of oxygen. Fish come to surface to get oxygen.

Lignite hangs to oil on fish scales after fish die and takes on same coloration as the lignite in the water.

Heavy rains in headwater mining sections caused large slug of mine acid to apparently kill many fish of all types. Estimate 97 percent of fish less than 5 inches in length. There can be very little kill above northern Lye Co. line as few fish live in river proper due to continuously low pH.

Caused by cyanide escaping from drains from blast furnaces at steel company. This is not this company's first offense. Witnesses state fish would swim in circles, leap in the air as if the water were too hot. Fish also would swim straight into banks and out onto shore. Many were buried in mud with only tail visible above the mud.

While the kill was caused by the discharge of 4,000 pounds of milk from an evaporating pan, effective treatment is needed for normal wastes, especially since production is being increased.

Kill was caused by oxygen depletion apparently triggered by an unauthorized application of copper sulfate applied at a time of too heavy algal bloom. It has been impossible to date to establish who conducted such treatment.

Lethal concentrations of tetrachloroethylene were found in the stream and the source established. It resulted from the reclamation of the solvent from Fuller's earth with filter material.

Diesel oil hose used to fill construction equipment faulty. Allowed oil to flow after trigger released. Siphoned even when pumps were not running. Soluble toxic materials in the oil killed the fish.

Steam explosion in boilers resulted in release of large amounts of steam and fly ash into the discharge canal. Several thousand dead channel catfish ranging in size from 6" to 4 pounds were noted in the canal.

Grasshopper spray suspected. Period of heavy spraying was mid-August. First rainfall after-

wards was on Labor Day weekend. Fish at lower end of affected area reportedly were slightly affected, but recovered. Five hundred fish were killed.

Effluent from sewage disposal plant largely responsible for prolific algae bloom depleting oxygen, and killing about 5,000 fish. Eutrophication due to effluent from plant has been apparent for several years.

Caused by liner in cooling system coming loose and plugged cooling system causing cyanide-laden water to escape into river. This was a relatively limited kill as stream had not recovered from previous very heavy kills by same steel company. Also, spill was of limited quantity.

Farmer left bags and cans containing endrin and manganese ethylene bisdithiocarbamate in stream and also spilled chemicals into water. Did not realize seriousness of this act. Agreed not to continue this procedure.

Over 1,000 fish killed by protein water from french fry plant. Bottom organisms drastically reduced throughout section and nearly depleted 3 miles below effluent due to bottom coverage by decaying algae, fungi, and protein water sludge, and low oxygen. This potato processing plant built several lagoons to restore oxygen and purify their protein water before discharge. They failed and effluent equaled or exceeded flow of the small stream. The pollution caused health problem as well in swimming pond below.

Fish poisoned by outlaws using rotenone. Investigation underway. Empty rotenone bags recovered from stream bank. This type of deliberate poisoning of fish occurs about 4 or 5 times each year in Kentucky.

Trees adjacent to the small lake were sprayed with DDT for Dutch Elm disease. This toxicant was confirmed by State Hygiene Laboratory. Over 1,000 fish were killed.

Attempt was made to lower a lake level adjacent to Lehner Lake. As the water was pumped into a sulfur pothole, it in turn overflowed into

Lehner Lake causing the fish kill. The sulfur settled over the entire bottom of the lake.

It appears that the fish were killed by a toxic material. Possibly a slimeicide used in washdown of waste plant by a box beard industry.

The river was depleted of dissolved oxygen by organic material. It is believed that this was waste from the canning plant lagoon. No discharge was found from the lagoon to the stream, but the lagoon did not contain the volume of wastes that it should have for the amount of tomatoes.

A hole in a heating coil allowed the chromium solution in a plating tank to leak into the sewer system and be discharged into the Warsaw sewer system. The sewage treatment plant could not remove all the chromium.

This kill occurred in a bayou of the river. It appeared that some fisherman may have thrown toxic material into the bayou. There is no source of waste or contamination in the area around the bayou.

A field tile had broken and this allowed the tomato wastes being sprayed on the field to be discharged into the Grassy Fork of Wildcat Creek.

The town needs to install sewage treatment facilities. In April the town was ordered by the Stream Pollution Control Board to construct facilities for the abatement of pollution in Halfway Creek. A rain on the night of August 26, flushed the sewage which had accumulated in the pockets of Halfway Creek further downstream and depleted the stream of dissolved oxygen causing the fish kill.

Over 176,000 fish killed because of acid mine drainage discharged into stream. Total money value of fish killed—\$36,764.60

Accidental discharge of sulfuric acid. Eradicated all aquatic life for 5 miles downstream.

pH dropped to 2.0 to 3.0. Error was publicly acknowledged by the company as an error in plant operation.

Five cars of sulfuric acid derailed on creek bank. Over 11,000 gallons of acid spilled and some got into creek. Railroad company added lime in an attempt to neutralize kill, but eradication of all aquatic life extended for 4 miles.

Overdose of copper sulfate made in small pond. Party responsible arrested for applying chemicals in waters of State without necessary permit.

Area was sprayed with chloral l.p.c. previous to a heavy rain. Natural drainage of area sprayed was toward pond.

Two hundred gallons of a solution containing chlordane and heptachlor used in treating nearby residence for termites seeped into one of the ground water spring sources for the hatchery. All fish killed were rainbow trout about 8" long.

Derailment of railroad tank car, spilling portion of load of some type of fuel oil into river, possibly some 5,000 gallons. This caused a complete kill of three species of trout for a distance of 3-4 miles, also aquatic insect life. The kill gradually decreased toward lower end of section. Dead suckers were found 20 miles from point of entry. Many distressed fish that probably will die. Very heavy oily film on water and rocks.

Methyl-mercury dicyandiamide was used to treat cotton seeds. The seeds, while going through a cotton seed delinting plant, were subjected to a concentrated sulfuric acid bath, thus releasing the substance into the sewage. Sewage plant used is inadequate.

Chemical company responsible for fish kill. Have pits under construction which will trap and hold this effluent consisting of caustic wash from vats being cleaned. Sump pump will discharge same into natural filter beds about 150 feet from stream.

TABLE 1.--Pollution-caused fish kill summary by State¹

State	Total number of reports	Reporting number of fish killed		Extent of damage					
		Number of reports	Number of fish	Miles of river		Acres of lake		Miles of shore	
				Number of reports	Miles	Number of reports	Acres	Number of reports	Miles
Alabama.....	4		(*)	1	5				
Arizona.....	1		(*)	1	6				
Arkansas.....	1		(*)	1	2				
California.....	15	10	203, 105	5	27	5	129		
Colorado.....	2	2	11, 000	1	25				
Connecticut.....	9	6	2, 505	3	5	1	1		
District of Columbia.....	2	1	3, 180, 000	1	2				
Florida.....	4		(*)	4	22				
Georgia.....	8		(*)	8	162				
Idaho.....	1	1	235, 900	1	2				
Illinois.....	13	13	292, 455	11	126	1	3		
Indiana.....	21	6	7, 533	15	37	1	4		
Iowa.....	3	2	5, 825						
Kansas.....	1	1	5, 000	1	2				
Kentucky.....	4	2	3, 600	2	31				
Louisiana.....	4	1	15, 000	3	14	1	1, 920		
Maine.....	3	2	4, 000	3	11				
Massachusetts.....	1	1	100						
Michigan.....	6	6	101, 938	2	16				
Minnesota.....	3		(*)	1	2				
Missouri.....	13	11	13, 800	8	31	3	8	2	3
Montana.....	3	3	1, 850	2	28				
Nebraska.....	6	1	100, 000	3	12	3	8		
New Jersey.....	2	1	4, 000	2	16				
New York.....	28	15	230, 260	19	37				
North Carolina.....	6	6	60, 000	6	277				
Ohio.....	19	18	358, 024	15	40				
Oregon.....	1	1	1, 000	1	1				
Pennsylvania.....	86	69	1, 010, 260	71	243			3	3
Rhode Island.....	3	2	350	3	6				
Tennessee.....	15	11	153, 484	13	73			1	7
Texas.....	68	19	30, 311	37	131	6	493	1	3
Virginia.....	6	5	18, 100	1	4	1	2		
Washington.....	8	6	132, 025	4	10	3	13	1	8
West Virginia.....	7	7	11, 850	7	35				
Wisconsin.....	2	2	2, 000	1	1			1	1
Wyoming.....	2	2	155	2	6				
Total.....	381	233	6, 195, 430	259	1, 448	25	2, 581	9	25

*Number of fish not reported (see page 4 of text).

¹ Reports from Delaware and Utah received too late to be included in tabular analyses.

TABLE 2.—Fish kill summary by source of pollution

Source	1962			1961 ¹
	Total number of reports	Reporting number of fish killed		Reported number of fish killed
		Number of reports	Number of fish	
Mining operations.....	19	13	694, 932	1, 085, 685
Agricultural poisons.....	49	28	91, 117	² 257, 618
Domestic sewage.....	32	18	3, 279, 566	162, 335
Industrial wastes.....	163	107	1, 151, 577	2, 859, 005
Other sources.....	45	21	446, 935	² 5, 571, 812
Unknown.....	73	46	531, 303	5, 763, 768
Total.....	381	233	6, 195, 430	² 14, 918, 113

¹ 1961 data published to reflect revisions.² Revised.³ Adds to 15,700,223 because of 782,110 fish reported from more than one source.

TABLE 3.—Estimated average size of kill and number killed by source of pollution

Source of pollution	Estimated average size of kill ¹			Estimated number killed ²	
	1960	1961	1962	1961	1962
Mining operations.....	1, 775	5, 710	5, 310	1, 103, 000	727, 000
Agricultural poisons.....	2, 285	5, 990	3, 255	³ 443, 000	159, 000
Domestic sewage.....	2, 830	5, 600	5, 855	291, 000	3, 362, 000
Industrial wastes.....	3, 950	7, 115	6, 530	3, 186, 000	1, 517, 000
Other sources.....	1, 910	5, 265	10, 550	³ 5, 704, 000	700, 000
Unknown.....	2, 990	7, 470	4, 490	5, 965, 000	653, 000
Average for all reports.....	2, 925	6, 535	5, 710		
Total.....				⁴ 16, 692, 000	7, 118, 000

¹ Adjusted to exclude reports showing 100,000 or more fish killed.² Includes all fish killed as reported plus the average number killed for each source applied to those reports where no actual number was given.³ Revised.⁴ Includes 782,000 from more than one source of pollution.

TABLE 4.—Estimated percentage distribution of fish killed by type

Source of pollution	1960			1961			1962		
	Game	Forage	Rough	Game	Forage	Rough	Game	Forage	Rough
Mining operations.....	19.9	74.9	5.2	14.8	68.6	16.6	32.2	62.2	5.6
Agricultural poisons ¹	46.6	24.9	28.5	15.1	71.1	13.8	43.8	38.1	18.1
Domestic sewage.....	4.2	5.6	90.2	20.2	35.9	43.9	17.9	77.1	5.0
Industrial wastes.....	5.6	20.2	74.2	9.0	46.7	44.3	19.8	67.2	13.0
Other sources ¹	37.7	24.2	38.1	4.0	93.3	2.7	62.7	32.3	5.0
Unknown.....	20.9	36.9	42.2	0.2	99.4	0.4	19.0	54.0	27.0
All reports.....	7.0	22.0	71.0	4.9	83.3	11.8	24.8	66.1	9.1

¹ 1961 data revised.

TABLE 5.—Estimated number of fish killed by type by source of pollution

Source	1961			1962		
	Game	Forage	Rough	Game	Forage	Rough
Mining operations.....	163,000	757,000	183,000	234,000	452,000	41,000
Agricultural poisons ¹	67,000	315,000	61,000	70,000	61,000	28,000
Domestic sewage.....	58,000	105,000	128,000	602,000	2,592,000	168,000
Industrial waste.....	287,000	1,488,000	1,411,000	300,000	1,020,000	197,000
Other sources ¹	227,000	5,320,000	157,000	439,000	226,000	35,000
Unknown.....	12,000	5,929,000	24,000	124,000	353,000	176,000
Total.....	814,000	13,914,000	1,964,000	1,769,000	4,704,000	645,000

¹ 1961 data revised.

TABLE 6.—Fish kill summary by type of water body

Type of water body	Total number of reports	Reporting number of fish killed		Extent of damage					
		Number of reports	Number of fish	Miles of River		Acres of Lake		Miles of Shore	
				Number of reports	Miles	Number of reports	Acres	Number of reports	Miles
River.....	324	197	5,791,940	259	1,448				
Lake.....	41	25	124,310			17	2,439	8	17
Bay.....	16	11	279,180			8	142	1	8
Total.....	381	233	6,195,430	259	1,448	25	2,581	9	25

TABLE 7.—Fish kill summary by type of water

Type of water	Total number of reports	Reporting number of fish killed	
		Number of reports	Number of fish
Fresh.....	363	221	5,901,250
Salt.....	8	5	91,150
Brackish.....	10	7	203,030
Total.....	381	233	6,195,430

TABLE 9.—Response as to whether a specific corrective action was recommended

Source	Yes	"None needed"	Not stated	Total
Mining operations.....	12	1	6	19
Agricultural poisons.....	24	1	24	49
Domestic sewage.....	12	3	17	32
Industrial wastes.....	83	3	77	163
Other sources.....	16	1	28	45
Unknown sources.....	1	4	68	73
Total.....	148	13	220	381

TABLE 8.—Response as to whether pollution caused significant changes in aquatic food organisms

Source	Yes	No	Not stated	Total
Mining operations.....	3	3	13	19
Agricultural poisons.....	11	3	35	49
Domestic sewage.....	3	5	24	32
Industrial wastes.....	45	23	95	163
Other sources.....	11	10	24	45
Unknown sources.....	7	16	50	73
Total.....	80	60	241	381

TABLE 10.—Responses as to severity of kill

Source	Total kill	Heavy kill	Moderate kill	Light kill	Not stated	Total
Mining operations.....	5	7	2	3	2	19
Agricultural poisons.....	11	21	7	10		49
Domestic sewage.....	6	9	8	7	2	32
Industrial wastes.....	31	52	43	24	13	163
Other sources.....	10	19	6	7	3	45
Unknown sources.....	6	14	24	28	1	73
Total.....	69	122	90	79	21	381

TABLE 11.—Response as to whether a specific causative agent was named

Source	Yes	Not stated	Total
Mining operations.....	15	4	19
Agricultural poisons.....	37	12	49
Domestic sewage.....	32		32
Industrial wastes.....	114	49	163
Other sources.....	37	8	45
Unknown sources.....	5	68	73
Total.....	240	141	381

TABLE 12.—Response as to duration of critical effect of pollution kill

Source	Yes	Not stated	Total
Mining operations.....	15	4	19
Agricultural poisons.....	31	18	49
Domestic sewage.....	20	12	32
Industrial wastes.....	124	39	163
Other sources.....	34	11	45
Unknown sources.....	41	32	73
Total.....	265	116	381

TABLE 13.—Response as to giving geographic extent of kill

Source	Yes	Not stated	Total
Mining operations.....	17	2	19
Agricultural poisons.....	34	15	49
Domestic sewage.....	25	7	32
Industrial wastes.....	127	36	163
Other sources.....	39	6	45
Unknown.....	47	26	73
Total.....	288	92	381

TABLE 14.—Response as to indicating types of fish killed

	Yes	Not stated	Total
Mining operations.....	17	2	19
Agricultural poisons.....	44	5	49
Domestic sewage.....	22	10	32
Industrial wastes.....	132	31	163
Other sources.....	40	5	45
Unknown sources.....	60	13	73
Total.....	315	66	381

TABLE 15.—Fish kill summary by date of kill

Month	Total number of reports	Reporting number of fish killed	
		Number of reports	Number of fish
January.....	6	5	241, 567
February.....	8	4	52, 026
March.....	12	10	247, 065
April.....	37	17	44, 765
May.....	53	38	90, 342
June.....	56	37	361, 150
July.....	69	43	475, 477
August.....	49	24	125, 859
September.....	47	31	13, 701, 907
October.....	31	16	676, 638
November.....	9	7	144, 634
December.....	4	1	4, 000
Total.....	381	233	6, 195, 430

¹ Includes 1 report of 3,180,000.

TABLE 16.—Frequency distribution of reported duration of critical effect
(Number of reports showing kills lasting indicated number of days)

Days	Mining operations	Agricultural poisons	Domestic sewage	Industrial wastes	Other sources	Unknown	Total
<1.....		4	1	21	2	12	40
1.....	4	5	9	33	7	11	69
2.....	4	7	4	30	15	7	67
3.....	2	5	2	19	2	5	35
4.....	1	3	1	1	4	1	11
5.....		4		8	2	2	16
6.....	1		1	1		2	5
7.....	3	1	1	5		1	11
8.....							
9.....				1			1
10.....		1	1	2	2		6
14.....		1		1			2
32.....				1			1
60.....				1			1
Total.....	15	31	20	124	34	41	265

TABLE 17.—Percentage of definite responses to selected questions

	Number killed	Specific agent	Type of fish	Severity of kill	Miles affected	Duration of effect	Food change	Corrective action
Mining operations.....	68	79	89	90	89	79	32	68
Agricultural poisons.....	57	76	90	100	69	63	29	51
Domestic sewage.....	56	100	69	94	78	62	25	47
Industrial wastes.....	66	70	81	92	78	76	42	53
Other sources.....	47	82	89	93	87	76	47	38
Unknown.....	63	7	82	99	64	56	32	7
All reports.....	61	63	83	94	76	70	37	42

Ratio of Percentages, 1962 to 1961

	Number killed	Specific agent	Type of fish	Severity of kill	Miles affected	Duration of effect	Food change	Corrective action
Mining operations.....	81	107	94	95	100	79	152	86
Agricultural poisons.....	97	185	94	103	91	80	126	80
Domestic sewage.....	100	100	87	104	116	98	167	76
Industrial wastes.....	86	130	96	100	103	100	162	78
Other sources.....	81	121	102	109	121	112	142	58
Unknown.....	97	88	105	109	96	84	213	20
All reports.....	94	121	98	102	104	96	161	69

**REPORT OF POLLUTION-CAUSED FISH KILLS
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RIVER OR LAKE AFFECTED	NEAREST TOWN OR CITY	DATE OF KILL			IMPUTED CAUSE OF KILL						TYPE OF FISH KILLED (PERCENT)			ESTIMATED NUMBER OF FISH KILLED	SEVERITY				ESTIMATED MILES OR ACRES AFFECTED	DURATION OF CRITICAL EFFECT	
		MONTH	DAY	YEAR	WILDERNESS OPERATIONS (1)	AGRICULTURE POLLUTION (2)	DOMESTIC WASTEWATER (3)	INDUSTRIAL WASTEWATER (4)	OTHER CAUSES (5)	UNKNOWN (6)	SALINE (7)	FRESH (8)	WATER (9)		TOTAL (10)	HEAVY (11)	MODERATE (12)	LIGHT (13)		DA.	HR.
ALABAMA																					
SWAN CREEK	ATHENS	5	14	62				3						-						-	-
CANABA RIVER	BRENT	9	--	62				4						5	0	95			2		1
TOMBIGBEE RIVER	NAHEOLA	9	--	62				4													-
BIG CREEK	TUSCALOOSA	8	26	62				3						8	0	92			1		5M
ARIZONA																					
BUCKEYE CANAL	BUCKEYE	10	3	62				3						10	0	90			2		6M
ARKANSAS																					
VILLAGE CREEK	NEWPORT	2	16	62				3						4	5	90					2M
CALIFORNIA																					
PALO VERDE N DRN	BLYTHE	10	27	62						6				31	0	69			37,000	1	4M
PALO VERDE W DRN	BLYTHE	9	22	62				2						14	5	80			9,000	1	11M
GOLETA SLOUGH	GOLETA	6	8	62				3						20	80	0			60,000	2	20A
LOS ANGELES RIV	LONG BEACH	10	30	62						6				0	100	0			5,000	3	5M
MARTINEZ HARBOR	MARTINEZ	7	6	62						6				100	0	0			30		-
SACRAMENTO RIVER	REDDING	2	13	62				1						100	0	0			-		4
RICHMOND HARBOR	RICHMOND	7	30	62						6				100	0	0			-		2
PALO VERDE CANAL	RIPLEY	7	30	62						6				0	100	0			75		3
SAN CARLO RAY	RODFO	10	2	62						6				74	0	26			-		1
SAN FRANCISCO BAY	SAN FRANCISCO	7	23	62				3		4				100	0	0			1,000		2
COASTAL WATERS	SAN DIEGO	8	23	62						5				0	100	0			37,800,000		3
LOS ANGELES HARB	SAN PEDRO	1	1	62						5				0	100	0			75,000		2
LOS ANGELES HARB	SAN PEDRO	9	28	62						4				0	100	0			1,000		3
LOS ANGELES HARB	SAN PEDRO	11	13	62						4				0	100	0			15,000		3
SAN FRANCISCO BAY	SAN FRANCISCO	3	30	62						6				0	100	0			-		4
DENVERTON SLOUGH	SUISON	10	13	62						6				-					-		3
COLORADO																					
PIRANCO HATCHERY	PIRANCO	4	24	62				2						100	0	0			7,000		2
EAGLE RIVER	ENTURN	12	2	62						5				95	5	0			4,000		1
CONNECTICUT																					
MATTABESSET R	REELIN	5	17	62				2						100	0	0			-		4
CHILD MUSEUM POND	CANTON	6	18	62				2						0	100	0			-		4
CHERRY BROOK	CANTON	6	18	62				2						50	0	50			25		4
WINDS POND	FAST WINDSOR	8	24	62				2						25	75	0			240		1
FARM RIVER	N BRANFORD	7	25	62						5				10	90	0			220		2
TRIA RISSFELL ROK	NORTH GRANBY	5	21	62				2						-					-		4
HOCKANUM RIVER	ROCKVILLE	5	7	62						6				0	100	0			20		4
GRAZIANO POND	SUFFIELD	6	20	62				2						100	0	0			1,000		2
MET DIST RES 263	WEST HARTFORD	5	25	62				2						60	20	20			1,000		3
DELAWARE																					
BROAD CREEK	LAUREL	4	19	62						5				40	60	0			-		2
DELAWARE RIVER	NEW CASTLE	6	7	62						6				40	60	0			-		2
REHOBOTH BAY	REHOBOTH BEACH	6	8	62						6				10	90	0			-		2
DIST. OF COLUMBIA																					
POTOMAC RIVER	DIST OF COL	9	10	62				3						-					-		2
ANACOSTIA RIVER	DIST OF COL	9	20	62				3						-					3,180,000		2

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RIVER OR LAKE AFFECTED	NEAREST TOWN OR CITY	DATE OF KILL			IMPUTED CAUSE OF KILL								TYPE OF FISH KILLED (PERCENT)			ESTIMATED NUMBER OF FISH KILLED	SEVERITY				ESTIMATED MILES OR ACRES AFFECTED	DURATION OF CRITICAL EFFECT	
		MONTH	DAY	YEAR	WATER QUALITY	TOXIC WASTE	SEWAGE	HERBICIDES	INSECTICIDES	OTHER	UNKNOWN	BASS	PERCH	WHALE	TOTAL		HEAVY	MODERATE	LIGHT				
FLORIDA																							
TROUT RIVER	DINSMORE	2	26	62				4					40	20	40	-		3			2M	2	-
FSCAMBIA RIVER	PENSACOLA	5	15	62				4					25	0	75	-	2				2M	-	18
FSCAMBIA RIVER	PENSACOLA	7	6	62				4					90	0	10	-	2				3M	-	12
LITTLE RIVER	QUINCY	6	5	62				4					95	5	0	-	2				15M	1	-
GEORGIA																							
CHATTANOOCHE RIV	ATLANTA	1	16	62				4					15	0	85	-			4		100M	3	-
OCHLOCKONFF RIV	CAIRO	8	3	62				4					-			-	1				10M	2	-
PETTIT CREEK	CARTERSVILLE	7	26	62					5				-			-			-		4M	-	-
CANOCHEE RIVER	CLAXTON	9	7	62				4					-			-	1				10M	2	-
FCHOCONEE CREEK	MACON	12	7	62						5			20	0	80	-			4		10M	4	-
OKPIKO CREEK	MOULTRIE	7	26	62				4					-			-	1				17M	-	-
WAMOO CREEK	NEWNAN	2	22	62				1					-			-	1				6M	1	-
OOSTANAULA RIVER	ROME	7	20	62				4					-			-	1				5M	2	-
IDAMO																							
RILEY CREEK	HAGERMAN	3	19	62						5			100	0	0	235,900		2			2M	-	6
ILLINOIS																							
RICHLAND CREEK	WELLSVILLE	5	18	62	1								100	0	0	4,171			4		3M	-	-
SUGAR CREEK	BLOOMINGTON	7	26	62					1				1	5	94	869			3		3M	-	-
BIG MUDDY RIVER	CARPONDAL	5	28	62					4				56	9	15	17,930		2			4M	2	-
MACOUPIN CREEK	CARLINVILLE	8	6	62									-			27,341		2			33M	2	-
SPORN RIVER	DAVIDA	9	26	62	1								22	60	18	176,523		2			17M	6	-
F BR KICKAPOO CR	DUNLAP	7	14	62					4				24	76	0	8,709	1				11M	5	-
S FK SAGAMON RIV	EDINBURG	7	15	62	1								17	24	39	2,419			4		22M	-	-
HORSESHOE LAKE	GRANITE CITY	11	19	62									100	0	0	17,824			3		3A	5	-
KYTE RIVER	ROCHELLE	11	18	62					3				0	81	19	14,250			3		6M	2	-
SANGAMON RIVER	SPRINGFIELD	8	8	62	1								37	7	41	10,061			3		21M	1	-
YELLOW CREEK	STOCKTON	6	26	62							6		1	84	15	1,695					1M	-	-
YELLOW CREEK	STOCKTON	8	14	62					4				3	54	43	6,727	1				3M	2	-
ATWO TRIP YEL CR	STOCKTON	8	11	62					4				1	81	18	1,936		2			-	1	-
INDIANA																							
HALFWAY CREEK	ALBANY	8	27	62					1				-			-			4		2M	1	-
DORSEY DITCH	CHALMERS	6	19	62					4				-			-			3		5M	1	-
BIG MOON DITCH	FRANCISVILLE	6	20	62					4				-			3,708			3		7M	-	6
PRAIRIE CREEK	FRANKFORT	5	2	62					4				-			200			3		2M	-	-
WOLF LAKE	HAMMOND	4	11	62							6		-			-			4		-	-	-
W FORK WHITE RIV	INDIANAPOLIS	10	5	62					4				-			-		2			2M	2	-
BUCK CREEK	LAGRANGE	5	28	62							5		-			-			4		-	-	-
WHITE RIVER	MINIF	6	28	62							1		-			100					1M	1	-
GR FK WILDCAT CR	POINT ISABEL	9	15	62					4				-			-			4		3M	1	-
UNNAMED STREAM	ROCHESTER	9	7	62							6		-			-			3		-	3	-
KANKAKEE RIVER	SCHNEIDER	7	15	62							6		-			-			3		-	1	-
SLASH CREEK	SHELBYVILLE	6	6	62							5		-			450			3		3M	2	-
LITTLE BUCK CR	SOUTHPORT	5	21	62					4				0	50	50	75			4		-	1	-
EAGLE CREEK	SPEEDWAY	10	-	62							5		0	90	10	-					2M	2	-
EAGLE CREEK	TRADERS POINT	10	-	62							6		10	0	90	-					1M	-	-
BLACK CREEK	VAN BUREN	10	13	62							6		-			-			3		3M	-	-
WARASH RIVER	WARASH	7	6	62							6		-			-			3		1M	1	-
WARASH RIVER	WARASH	8	3	62					4				-			-			3		1M	1	-
SALAMONIE RIVER	WARREN	9	15	62					4				-			-		2			3M	2	-
WALNUT CREEK	WARSAW	9	19	62					4				-			-			3		1M	1	-
LEHNER LAKE	YOUNGSTOWN	11	15	62							5		2	0	98	1,000			4		4A	2	-
IOWA																							
GRAND VIEW POND	DES MOINES	10	27	62					2				10	0	90	1,000			3		-	3	-
OLD CITY RESERVR	MT AYR	6	8	62							5		100	0	0	4,825			2		-	2	-
FLOYD RIVER	SIOUX CITY	4	6	62							4		0	0	100	-				4	-	1	-

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RIVER OR LAKE AFFECTED	NEAREST TOWN OR CITY	DATE OF KILL			IMPUTED CAUSE OF KILL							TYPE OF FISH KILLED (PERCENT)			ESTIMATED NUMBER OF FISH KILLED	SEVERITY				ESTIMATED MILES OR ACRES AFFECTED	DURATION OF CRITICAL EFFECT	
		MONTH	DAY	YEAR	MINING OPERATIONS (1)	SEWAGE TREATMENT PLANT (2)	POISON (3)	MOTOR OIL (4)	INDUSTRIAL WASTES (5)	OTHER (6)	UNKNOWN (7)	GAS (8)	FREEZE (9)	TRASH (10)		TOTAL (11)	HEAVY (12)	MODERATE (13)	LIGHT (14)		DA.	HR.
KANSAS																						
PAWNEE RIVER	BURDETT	6	15	62					4			60	5	55	5,000	2				2M	-	
KENTUCKY																						
BANKLICK CREEK	COVINGTON	10	5	62					4			10	30	60	1,600	1				-	1	
HORSE CREEK	MANCHESTER	9	16	62	1							10	80	10	2,000		3			-	1	
RED BIRD RIVER	MANCHESTER	7	21	62					5			20	20	60	-	1				1M	4	
S CUMBERLAND RIV	STEARNS	6	-	62	1							5	10	85	-		2			30M	2	
LOUISIANA																						
BOGUE LUSA CREEK	BOCALUSA	4	11	62					4			10	20	70	-		3			1M	1	
OUACHITA RIVER	MONROE	6	29	62		2					6	3	10	87	-		2			2M	1	
L PONCHARTRAIN	NEW ORLEANS	6	29	62								20	30	50	15,000		3			1,920A	6	
OUACHITA RIVER	STERLINGTON	7	12	62		2						20	20	60	-			4		11M	2	
MAINE																						
PRESTILE STREAM	EASTON	6	20	62					4			15	0	85	1,000		2			8M	60	
MEDUXNEKEAG RIV	HOULTON	7	-	62					4			0	0	100	3,000	1				1M	2	
HALFMOON STREAM	THORNDIKE	7	31	62		2						0	50	50	-		2			2M	-	
MASSACHUSETTS																						
SHAWSHEEN RIVER	ANDOVER	6	22	62					4			50	10	40	100	2				-	-	
MICHIGAN																						
FITTS CREEK	ADDISON	6	16	62					5			7	60	33	12,643					6M	-	
FRERHARD LAKE	BURN OAK	6	25	62		2						75	0	25	3,675		2			-	3	
STONE LAKE	CASSOPOLIS	9	14	62			3					80	20	0	4,950			3		-	-	
SHIAWASSEE RIVER	OWASSO	6	16	62					4			35	0	65	76,875	1				10M	-	
FISH CREEK	STANTON	6	28	62		2						50	0	50	1,744		2			-	-	
RABBIT RIVER	WAYLAND	8	25	62					4			1	33	66	2,051			3		-	-	
MINNESOTA																						
BUFFALO RIVER	GLENCOE	9	17	62					4			0	0	100	-					-	-	
MINNESOTA RIVER	LESUE R	9	22	62					4			0	0	100	-		2			-	-	
WILLOW CREEK	ROCHESTER	6	3	62					4			0	50	50	-	1				2M	-	
MISSOURI																						
STOUTS CREEK	ARCADIA	7	1	62					5			2	80	18	1,500	1				1M	3	
CENTER CREEK	CARTHAGE	8	6	62					4			-			-		2			8M	2	
BIG CEDAR CREEK	COLUMBIA	10	25	62	1							50	50	0	8,000		2			12M	2	
FARM POND	COLUMBIA	7	10	62		2						0	100	0	100		2			2A	-	
FOUR RIVER	KAHOKA	9	4	62		2						30	0	70	500		2			2M	2	
CAL MONTROSE LK	LADUE	8	11	62					4			100	0	0	-		2			1M	2	
MONTROSE LAKE	LADUE	2	16	62					4			60	40	0	100			3		1M	1	
MONTROSE LAKE	LADUE	4	24	62					4			50	50	0	1,000			3		1A	2	
HONEY CREEK	MARTONVILLE	5	9	62					4			15	0	85	1,500		2			1M	-	12
MEYER LAKE	MARSHALL	5	1	62					4			0	100	0	200			3		5A	10	
LAKE SPRINGFIELD	SPRINGFIELD	9	5	62					4			50	50	0	600			3		2M	3	
PEARSON CREEK	SPRINGFIELD	8	3	62					4			10	90	0	100	1				1M	3	
WILSON CREEK	SPRINGFIELD	5	10	62					4			0	100	0	200			3		5M	2	

**REPORT OF POLLUTION-CAUSED FISH KILLS
CUMULATIVE LISTING OF REPORTS RECEIVED AS OF DATE OF TABULATION**

RIVER OR LAKE AFFECTED	NEAREST TOWN OR CITY	DATE OF KILL			IMPUTED CAUSE OF KILL								TYPE OF FISH KILLED (PERCENT)			ESTIMATED NUMBER OF FISH KILLED	SEVERITY				ESTIMATED MILES OR ACRES AFFECTED	DURATION OF CRITICAL EFFECT	
		MONTH	DAY	YEAR	NATURAL	ARTIFICIAL	DOMESTIC	INDUSTRIAL	WASTE	OTHER	UNKNOWN	BASS	PERCH	TROUT	TOTAL		HEAVY	MODERATE	SLIGHT	DA.		HR.	
																							(1)
MONTANA																							
L BOULDER RIVER	BOULDER	7	2	62									88	12	0	200					18M	-	-
COTTONWOOD CREEK	ROZEMAN	7	18	62	2								70	30	0	1,000		2			-	-	-
CLARK FK COL R	DEER LODGE	7	27	62							6		92	0	8	650			3		10M	2	-
NEBRASKA																							
SCHUETZ LAKE	CHENFY	7	9	62									90	5	5	-		2			3A	4	-
WOOD RIVER	GRAND ISLAND	10	15	62					4				10	80	10	100,000		1			2M	-	-
REDDISH LAKE	HALLAM	6	10	62							6		0	1	99	-		1			4A	-	-
HEARTWELL PARK L	HASTINGS	4	15	67							5		98	2	0	-			2		1A	5	-
LOST CREEK	SCHUYLER	7	10	62							5		1	0	99	-			2		2M	-	-
SHELL CREEK	SCHUYLER	8	16	62							6		50	2V	5	-			2		8M	-	-
NEW JERSEY																							
DELAWARE RIVER	BURLINGTON	6	1	62							6		10	90	0	4,000		2			15M	5	-
CHESNUT BRANCH	SEWELL	4	28	62							3		0	0	100	-			3		1M	2	-
NEW YORK																							
SUSQUEHANNA RIV	BINGHAMTON	7	17	62							3		-	-	-	1,000			3		-	-	-
ROCKPORT CREEK	ROCKPORT	6	30	62							4		-	-	-	1,000		1			1M	-	-
CONHOCTON RIVER	CONHOCTON	8	29	62							4		10	20	70	-		2			2M	-	-
SANDRURG CREEK	ELLENVILLE	6	-	62							5		20	60	20	-			1		1M	-	-
CHEMUNG RIVER	ELMIRA	7	20	62							6		30	40	30	200,000		2			5M	-	-
BUSH KILL	ELFISCHMANNS	10	28	62							5		25	45	30	-			2		3M	2	-
FAST KAY	GAINESVILLE	8	19	62							6		30	40	30	300		2			1M	-	-
LITTLE BLACK CR	GATES	5	17	62							6		-	-	-	-				4	-	-	-
OWASCO INLET	GROTON	6	27	62							6		0	0	100	200			3		-	-	-
TRIP 11 18 MI CR	HAMRURG	10	2	62							5		0	60	40	-			3		1M	-	-
WEST CREEK	HAMLIN	10	2	62							4		0	60	40	-		1			2M	2	-
RAMAPO RIVER	HARRIMAN	5	28	62							6		20	60	20	-			1		2M	-	-
JOHNSONS CREEK	LYNDONVILLE	11	18	62							6		10	60	30	-			2		3M	-	-
ORISKANY CREEK	LYONS MILL	8	21	62							4		20	50	30	-			2		3M	-	-
CANANDAIGUA RIV	MANCHESTER	9	24	62							4		10	60	30	3,000		2			2M	-	-
GENESSE RIVER	MT MORRIS	8	30	62							4		-	-	-	-					-	-	-
NASSAU LAKE	NASSAU	8	25	62							5		10	60	30	10,000		2			-	2	-
L BROOKENSTREAM	NITON	8	11	62							6		-	-	-	-			3		1M	-	-
ONEIDA CREEK	ONEIDA	5	31	62							3		0	60	40	450			2		1M	1	-
HACKENSACK RIVER	ORANGEBURG	6	12	62							4		10	50	40	3,000		1			-	-	12
BEAR CREEK	PIERREFORT MANR	9	9	62							4		0	60	40	2,000		1			-	-	-
SENECA RIVER	SENECA FALLS	9	3	62							3		-	-	-	3,000					-	-	-
TAYLOR CREEK	SHERBRIEL	7	5	62							4		0	80	20	1,000		1			1M	-	-
JOE & CATLIN CRS	SLATE HILL	5	9	62							4		0	90	10	250			2		1M	1	-
W BR DELAWARE R	STAMFORD	7	1	62							5		10	30	60	-			2		3M	-	-
LAKE AUTUM	SUFFERN	5	29	62							6		0	0	100	-				4	-	-	-
ELLICOTT CREEK	TONAWANDA	4	30	62							6		10	70	20	60				4	1M	-	-
BIG CR WTRVIL BR	WATERVILLE	8	8	62							4		15	40	45	5,000					3M	-	-
NORTH CAROLINA																							
FRENCH BROAD RIV	BREVARD	7	5	62							4		1	0	99	10,000		1			19M	1	-
NE CAPE FEAR RIV	MT OLIVE	5	30	62							4		25	37	38	10,000					3M	-	-
LONG CREEK	ROBBINSVILLE	6	13	62							3		100	0	0	500		1			2M	-	-
ROANOKE RIVER	WELDON	7	14	62							6		-	-	-	17,500			3		120M	5	-
ROANOKE RIVER	WELDON	8	2	62							6		1	4	95	20,000		2			130M	6	-
CONTENEA CREEK	WILSON	6	15	62							4		25	0	75	2,000			2		3M	2	-
OHIO																							
WILLS CREEK	CAMBRIDGE	10	8	62							6		34	14	50	1,050				4	1M	-	-
SOUTH CREEK	CLYDE	8	20	62							4		25	25	50	-		1			-	-	-
OLENTANGY RIVER	COLUMBUS	7	12	62							4		2	15	83	18,365			3		2M	1	-
GREAT MIAMI RIV	DAYTON	5	24	62							4		10	0	90	120				4	-	2	-
RILEY CREEK	FOSTORIA	6	27	62							4		5	50	45	10,000		1			5M	4	-
GREAT MIAMI RIV	HAMILTON	6	29	62							4		0	90	10	106,750			3		1M	3	-
BLACK RIVER	LORAIN	9	4	62							6		10	90	0	60,000			2		4M	2	-

REPORT OF POLLUTION-CAUSED FISH KILLS
CUMULATIVE LISTING OF REPORTS RECEIVED AS OF DATE OF TABULATION

RIVER OR LAKE AFFECTED	NEAREST TOWN OR CITY	DATE OF KILL			IMPUTED CAUSE OF KILL										TYPE OF FISH KILLED (PERCENT)			ESTIMATED NUMBER OF FISH KILLED	SEVERITY				ESTIMATED MILES OF ACRES AFFECTED	DURATION OF FISH KILL	DURATION OF FISH KILL																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
		MONTH	DAY	YEAR	1	2	3	4	5	6	7	8	9	10	11	12	13		14	15	16	17				18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130	131	132	133	134	135	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159	160	161	162	163	164	165	166	167	168	169	170	171	172	173	174	175	176	177	178	179	180	181	182	183	184	185	186	187	188	189	190	191	192	193	194	195	196	197	198	199	200	201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230	231	232	233	234	235	236	237	238	239	240	241	242	243	244	245	246	247	248	249	250	251	252	253	254	255	256	257	258	259	260	261	262	263	264	265	266	267	268	269	270	271	272	273	274	275	276	277	278	279	280	281	282	283	284	285	286	287	288	289	290	291	292	293	294	295	296	297	298	299	300	301	302	303	304	305	306	307	308	309	310	311	312	313	314	315	316	317	318	319	320	321	322	323	324	325	326	327	328	329	330	331	332	333	334	335	336	337	338	339	340	341	342	343	344	345	346	347	348	349	350	351	352	353	354	355	356	357	358	359	360	361	362	363	364	365	366	367	368	369	370	371	372	373	374	375	376	377	378	379	380	381	382	383	384	385	386	387	388	389	390	391	392	393	394	395	396	397	398	399	400	401	402	403	404	405	406	407	408	409	410	411	412	413	414	415	416	417	418	419	420	421	422	423	424	425	426	427	428	429	430	431	432	433	434	435	436	437	438	439	440	441	442	443	444	445	446	447	448	449	450	451	452	453	454	455	456	457	458	459	460	461	462	463	464	465	466	467	468	469	470	471	472	473	474	475	476	477	478	479	480	481	482	483	484	485	486	487	488	489	490	491	492	493	494	495	496	497	498	499	500	501	502	503	504	505	506	507	508	509	510	511	512	513	514	515	516	517	518	519	520	521	522	523	524	525	526	527	528	529	530	531	532	533	534	535	536	537	538	539	540	541	542	543	544	545	546	547	548	549	550	551	552	553	554	555	556	557	558	559	560	561	562	563	564	565	566	567	568	569	570	571	572	573	574	575	576	577	578	579	580	581	582	583	584	585	586	587	588	589	590	591	592	593	594	595	596	597	598	599	600	601	602	603	604	605	606	607	608	609	610	611	612	613	614	615	616	617	618	619	620	621	622	623	624	625	626	627	628	629	630	631	632	633	634	635	636	637	638	639	640	641	642	643	644	645	646	647	648	649	650	651	652	653	654	655	656	657	658	659	660	661	662	663	664	665	666	667	668	669	670	671	672	673	674	675	676	677	678	679	680	681	682	683	684	685	686	687	688	689	690	691	692	693	694	695	696	697	698	699	700	701	702	703	704	705	706	707	708	709	710	711	712	713	714	715	716	717	718	719	720	721	722	723	724	725	726	727	728	729	730	731	732	733	734	735	736	737	738	739	740	741	742	743	744	745	746	747	748	749	750	751	752	753	754	755	756	757	758	759	760	761	762	763	764	765	766	767	768	769	770	771	772	773	774	775	776	777	778	779	780	781	782	783	784	785	786	787	788	789	790	791	792	793	794	795	796	797	798	799	800	801	802	803	804	805	806	807	808	809	810	811	812	813	814	815	816	817	818	819	820	821	822	823	824	825	826	827	828	829	830	831	832	833	834	835	836	837	838	839	840	841	842	843	844	845	846	847	848	849	850	851	852	853	854	855	856	857	858	859	860	861	862	863	864	865	866	867	868	869	870	871	872	873	874	875	876	877	878	879	880	881	882	883	884	885	886	887	888	889	890	891	892	893	894	895	896	897	898	899	900	901	902	903	904	905	906	907	908	909	910	911	912	913	914	915	916	917	918	919	920	921	922	923	924	925	926	927	928	929	930	931	932	933	934	935	936	937	938	939	940	941	942	943	944	945	946	947	948	949	950	951	952	953	954	955	956	957	958	959	960	961	962	963	964	965	966	967	968	969	970	971	972	973	974	975	976	977	978	979	980	981	982	983	984	985	986	987	988	989	990	991	992	993	994	995	996	997	998	999	1000	1001	1002	1003	1004	1005	1006	1007	1008	1009	1010	1011	1012	1013	1014	1015	1016	1017	1018	1019	1020	1021	1022	1023	1024	1025	1026	1027	1028	1029	1030	1031	1032	1033	1034	1035	1036	1037	1038	1039	1040	1041	1042	1043	1044	1045	1046	1047	1048	1049	1050	1051	1052	1053	1054	1055	1056	1057	1058	1059	1060	1061	1062	1063	1064	1065	1066	1067	1068	1069	1070	1071	1072	1073	1074	1075	1076	1077	1078	1079	1080	1081	1082	1083	1084	1085	1086	1087	1088	1089	1090	1091	1092	1093	1094

REPORT OF POLLUTION-CAUSED FISH KILLS
CUMULATIVE LISTING OF REPORTS RECEIVED AS OF DATE OF TABULATION

RIVER OR LAKE AFFECTED	NEAREST TOWN OR CITY	DATE OF KILL			IMPUTED CAUSE OF KILL								TYPE OF FISH KILLED (PERCENT)			ESTIMATED NUMBER OF FISH KILLED	SEVERITY				ESTIMATED MILES OR ACRES AFFECTED	ESTIMATED NUMBER OF FISH AFFECTED		
		MONTH	DAY	YEAR	WILDERNESS	WILDERNESS	WILDERNESS	WILDERNESS	WILDERNESS	WILDERNESS	WILDERNESS	WILDERNESS	WILDERNESS	WILDERNESS	WILDERNESS		WILDERNESS	WILDERNESS	WILDERNESS	WILDERNESS		WILDERNESS	WILDERNESS	
																								(1)
PENNSYLVANIA CONT.																								
SWAMP CREEK	MORGANTOWN	3	27	62										20	80	0		119	2			1M	2	-
TULPEHOCKEN CR	MYERSTOWN	5	29	62	2									100	0	0		83		3		1M	1	-
WILL CREEK	NFW HOLLAND	5	12	62						6				100	0	0		81				1M	1	-
BOWWENS CREEK	NORFOLK	1	23	62						4				14	85	0		24,341	2			9M	2	-
OIL CREEK	OIL CITY	8	3	62										30	70	0		-		3		1M	2	-
OIL CREEK	OIL CITY	10	1	62										40	50	0		250		3		1M	1	-
SPRUCE CREEK	PA FURNACE	6	7	62						4				20	80	0		9,000				2M	1	-
LITTLE SANDY CR	POLK	5	22	62						3				25	75	0		35				1M	1	-
DELAWARE RIVER	PORTLAND	7	26	62						4				100	0	0		8				1M	1	-
F RR CODORUS CR	POTOSI	3	27	62						4				20	80	0		300				1M	1	-
MAHONING CREEK	PUNKSUTAWNEY	8	22	62						4				0	0	100		500	3			1M	32	-
HOUSE CREEK	RED CROSS	7	30	62						4				20	80	0		5,137		3		1M	1	-
CONEWAGO CREEK	RUSSELL	10	15	62						3				0	100	0		10,000	1			2M	3	-
RAYSTOWN RR	SAXTON	5	6	62						4				65	35	0		3,441		2		5M	3	-
TRIM HILL CR	SCHNECKSVILLE	5	26	62							5			25	75	0		-	1			2M	2	-
TRIM DENNIS CREEK	SELINGSVILLE	8	29	62						3				40	60	0		12			4	1M	2	-
MCCOLLOUGH RUN	SHARPSVILLE	4	13	62						4				10	90	0		24,420		2		-	2	-
LACKAWANNA RIVER	SIMPSON	9	8	62										20	80	0		70,262	1			3M	7	-
POOLESSING CREEK	SOMERTON	7	12	62										14	84	0		147,217				3M	5	-
PEGUEA CREEK	STRASBURG	9	18	62										40	50	0		277				1M	-12	-
TRIM/PARADISE CR	THOMASVILLE	9	26	62							6			10	90	0		8,142		2		3M	2	-
SO RR GLADE RUN	TWIN WILLOWS	7	7	62										0	100	0		300				1M	-12	-
PINE CREEK	VALLEY VIEW	6	30	62						4				100	0	0		40				1M	-12	-
L CONNHAITE CR	WATERFORD	9	3	62						2				0	80	20		100				1M	1	-
FIVE FORKS CREEK	WAYNESBORO	6	--	62						2				50	50	0		-		2		1M	1	-
L ANTIETAM CR	WAYNESBORO	6	13	62							5			40	60	0		-				1M	7	-
TRIM LAUREL F CR	WELLS TANNERY	5	--	62	1									0	100	0		-	1			1M	7	-
WILL/CODORUS CR	YORK	11	18	62							4			40	60	0		6,985		2		4M	7	-
CROOKED RUN CR	ZIONS GROVE	7	18	62						2				100	0	0		6,000		2		3M	5	-
RHODE ISLAND																								
PAWCATUCK RIVER	ASHAWAY	7	25	62						4				5	15	80		-			4	3M	14	-
PAWTUXET RIVER	COVENTRY	6	22	62						4				0	0	100		100			4	2M	-3	-
MESHANICUT BROOK	CRANSTON	4	20	62										40	50	0		250	1			1M	3	-
TENNESSEE																								
RIG CREEK	ALTAMONT	3	9	62	1									10	90	0		300	1	2		10M	5	-
WHITE HORN CREEK	BULLS GAP	11	11	62							5			36	51	13		85,440				10M	-	-
FILLAVIER CREEK	CLEVELAND	2	2	62										5	85	10		5,000	1			5M	14	-
SOUTH HOUSE CR	CLEVELAND	5	16	62										4	10	85		-	2			6M	-	-
BOONE L WATAUGA	JOHNSON CITY	10	15	62							4			12	69	19		30,000		3		7M	5	-
SINKING CREEK	JOHNSON CITY	10	22	62										1	95	4		250		3		2M	-	-
HURRICANE CREEK	LAVERGNE	12	10	62														-				3M	-	-
SHOAL CREEK	LAWRENCEBURG	4	17	62										40	20	30		4,000		2		1M	-6	-
DRY MELLOW CREEK	LIVINGSTON	5	5	62										2	95	3		300	1			7M	-	-
STEEKEE CREEK	LOIDON	3	12	62										10	80	10		5,000				4M	1	-
F FK MULBERRY CR	LYNCHBURG	4	--	62										10	70	20		-		3		2M	-	-
LOOSAHATCHIE RIV	HILLINGTON	5	8	62										49	1	50		3,494				10M	3	-
LOOSAHATCHIE RIV	HILLINGTON	6	28	62										0				-		3		-	-	-
GATTIS CREEK	SAVANNAH	8	13	62										0	1	99		6,500				-	-	-
BEAVERDAM CREEK	SHADY VALLEY	5	22	62										5	93	2		12,000		2		12M	5	-
TEXAS																								
CLEAR FK BRAZOS	ALBANY	4	12	62										-				-				-	-	-
HALLS BAYOU	ALTA LOMA	6	11	62										10	10	80		-		2		5M	3	-
DRAINAGE DITCH	ALVIN	6	12	62										33	33	34		-			3	1M	-	-
LAKE RETRIEVE	ANGLETON	9	19	62										60	30	10		10,000		2		-	2	-
COLORADO RIVER	AUSTIN	4	5	62										0	60	40		200				2M	2	-
COLORADO RIVER	AUSTIN	6	7	62										0				-				2M	-16	-
CREEK NR DELWOOD	AUSTIN	4	25	62										-				-				1M	3	-
TIMLE CREEK	BLUFING	5	4	62										-				-				5M	1	-
LAKE RICHMAN	BLUFFTON	6	--	62										0				-				-	-	-
CANADIAN RIVER	BORGER	7	2	62										0	100	0		-				10M	10	-
PLUM CREEK	CANADIAN	4	14	62										50	50	0		-				2M	-	-
GARLAND TERRELL	CHILDRESS	9	15	62										50	50	0		-		2		6A	-	-
COOK RANCH LAKE	CLARENDON	10	1	62										10	25	65		-				5A	-	-
L CRYSTAL CREEK	CONROE	4	14	62										30	20	50		500		3		3M	5	-
PINEY CREEK	CORPICO	9	1	62										50	40	10		-				-	-12	-
LAKE OF PINES	DAINGERFIELD	10	2	62										2	60	58		200				1M	-	-
ANGELINA RIVER	DITROLL	6	30	62										50	50	0		150		3		1M	-	-
NAVASOTA RIVER	EASTERLY	7	--	62										-				-		1		5M	-	-
MUSTANG CREEK	FL CAMPO	6	18	62										-				-				-	-	-

**REPORT OF POLLUTION-CAUSED FISH KILLS
CUMULATIVE LISTING OF REPORTS RECEIVED AS OF DATE OF TABULATION**

RIVER OR LAKE AFFECTED	NEAREST TOWN OR CITY	DATE OF KILL			IMPUTED CAUSE OF KILL								TYPE OF FISH KILLED (PERCENT)			ESTIMATED NUMBER OF FISH KILLED	SEVERITY				ESTIMATED MILES OR ACRES AFFECTED	DURATION OF FISH KILL	
		MONTH	DAY	YEAR	SEWAGE TREATMENT PLANT	AGRICULTURAL PESTICIDES	DOMESTIC SEWAGE	INDUSTRIAL WASTES	OTHER	UNKNOWN	BASS	POSSIES	TROUT	TOTAL	HEAVY		MODERATE	LIGHT	DA	HR			
TEXAS CONT.																							
BUFFALO CREEK	ELECTRA	4	14	62			4																
CLEAR FORK	ELIASVILLE	4	20	62			4																
DRAIN CANAL/FARM	PARFNS	8	15	62	2						2	0	98	2,000	2				3M		5		
CADDO CREEK	FRANKSTON	12	18	62			4				45	30	25					4	2M		2		
INTERCOASTAL CNL	FREEDPORT	7	26	62				6			1	98	1					4			12		
CLEAR CREEK	FRIENDSWOOD	4	12	62					6		0	100	0	200				4					
SCARBOROUGH RR	HALLETTSVILLE	6	4	62			4				90	0	10	5,000	1						10		
WATER HOLE CREEK	HALLETTSVILLE	3	24	62			4				50	10	40	300					3M		3		
BIG FOSKIL CREEK	HALTOM CITY	4	25	62	1						50	10	40			2			1M		4		
HAMLIN LAKE	HAMLIN	7	3	62			4									3			3M		1		
BOWLES CREEK	HENDERSON	7	21	62				6			80	0	20	200		3			4M		4		
LAKE WICHITA	HOLIDAY	8	3	62			4				0	0	100			4							
SAN BERNARD RIV	HUNGERFORD	5	28	62	2						10	40	50	2,000	1				1M				
HARMON CREEK	HUNTSVILLE	4	13	62				6			0	2	98			2					1		
CANEY CREEK	JACINTO	5	3	62	2												4		20M		4		
SULPHUR CREEK	LAMPASAS	5	17	62	1						50	25	25	200	1				2M		1		
BIG CANE CREEK	LIVINGSTON	5	16	62				6			10	0	90	100			4		2M		6		
LAKE OF PINES	LONG STAR	11	27	62			4				20	40	40			2			150A		1		
TANABOGUE CREEK	LOVELAND	5	8	62			4				30	30	40	5,000	2						3		
COLLARD CREEK	MADISONVILLE	4	--	62			4										4		2M				
SARINE RIVER	MARSHALL	9	8	62			4				10	0	90	2,000		2			8M		2		
TRIN/KICKAPOO CR	MEGARGEL	4	27	62			4																
JACKS CREEK	MEXIA	5	29	62			4				5	85	10	500		3			1M		1		
CONCHO RIVER	MILPS	4	28	62	2						5	10	85			3			1M		12		
WHITE OAK CREEK	MOUNT VERNON	8	14	62				5			50	15	35	1,680		2			2M		2		
BUCK CREEK	PADUCAH	8	3	62	2						0	50	50			1			10M		2		
COLONY	RANGER	4	27	62				5											3M				
UNNAMED STREAM	SAGINAW	4	6	62			4				50	30	20			1					7		
CNL FISH HATCHRY	SAN ANGELO	8	8	62	2						10	50	40				4		1M		3		
SAN ANTONIO RIV	SAN ANTONIO	7	19	62			4				95	0	5			3					1		
SAN ANTONIO RIV	SAN ANTONIO	10	10	62					6		0	0	100			2					1		
SALADO CREEK	SAN ANTONIO	7	13	62					6		10	20	70			1							
SALADO CREEK	SAN ANTONIO	10	3	62			4				10	20	70			2					2		
GALVESTON BAY	SAN LEON	7	19	62			4				50	50	0	75							3		
PECOS RIVER	SHEFFIELD	5	27	62				5			40	20	40			2			15M		10		
GREENS BAYOU	SHELDON	8	5	62	3						20	0	80			2			6M		10		
SPRING CREEK	SHOWWOOD	8	21	62				5			5	40	55			1			1M		1		
UNNAMED LAKE	SIMONTON	8	16	62	2											1			30A		10		
CLEAR FORK	SOUTH BEND	4	20	62			4																
BIG ELW CREEK	TEMPLE	7	26	62				5			30	20	50			1			1M		1		
MARSH AREA	TEXAS CITY	10	1	62				6			0	100	0				4				12		
SWAN LAKE	TEXAS CITY	7	26	62			4																
COLORADO RIVER	TRAVIS CO	9	27	62				6			50	25	25			2					2		
NECHES RIVER	TYLER	7	15	62	1						5	25	0				3		1M		1		
WAXAHACHIE CREEK	WAXAHACHIE	7	11	62				6			10	10	80						1M		1		
CLEAR CREEK	WERTER	9	19	62				6			0	100	0				4		1M		1		
OLD CANEY CREEK	WHARTON	6	26	62				4											1M				
WICHITA R WTRSHD	WICHITA FALLS	9	7	62					5		75	0	25			2			2A				
UNNAMED STREAM	WINDSBORO	9	21	62				5			50	25	25			2					4		
UTAH																							
JORDAN RIVER	MIDVALE	10	12	62			4									3			1M		3		
VIRGINIA																							
JAMES RIVER	LYNCHBURG	8	29	62			4				0	0	100			1			4M		2		
BEAK CREEK	PULASKI	4	13	62				6			100	0	0	250		3					12		
CHOPAWANSIC CR	QUANTICO	5	28	62			5				100	0	0	200	1						2		
STAPLES MILL RD	RICHMOND	3	29	62				6			100	0	0	300			3						
TALLEYS POND	RICHMOND	1	7	62				6			100	0	0	350			2				3		
LAKE HOLLY	VIRGINIA BEACH	6	26	62			4				95	0	5	17,000		2			2A		3		
WASHINGTON																							
MARSH CREEK	ARLINGTON	4	5	62			4				100	0	0	3,000		2			3M				
DILLENBAUGH CR	CHEHALIS	4	30	62			4				100	0	0	25			4		1M				
RR MILL CREEK	COLLEGE PLACE	7	2	62			4				50	0	50			2			5M				
PORT GARDNER BAY	EVERETT	5	14	62			4				0	95	5	1,500		2			2A		2		
PORT GARDNER BAY	EVERETT	5	14	62			4				1	98	1	500		2			1A		1		
GRAYS HARBOR	HOOH'AM	7	28	62			4				50	25	25			2			8M		7		
BULLMAN CREEK	SEK	9	12	62				6			100	0	0	2,000		1			1M				
HYLBOS WATERWAY	TACOMA	1	2	62			4				0	100	0	125,000		2			10A		8		

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RIVER OR LAKE AFFECTED	NEAREST TOWN OR CITY	DATE OF KILL			IMPUTED CAUSE OF KILL						TYPE OF FISH KILLED (PERCENT)			ESTIMATED NUMBER OF FISH KILLED	SEVERITY				ESTIMATED MILES OR ACRES AFFECTED	DURATION OF POLLUTION CRITICAL EFFECT			
		MONTH	DAY	YEAR	MINING OPERATIONS	FABRIC-ATIONS	DOMESTIC WASTE	INDUSTRIAL WASTE	OTHER	UNKNOWN	BONE	POOR	FRESH		TOTAL	HEAVY	MODERATE	LIGHT		DA.	NR.		
WEST VIRGINIA																							
BLUFSTONE RIVER	BLUEFIELD	7	16	62				4					5	15	80		250		3			3M	5
FLK TWO MILE	CHARLESTON	6	16	62				4					0	100	0		10,000	1				1M	-
L KANAWHA RIVER	GLENVILLE	2	2	62	1								3	7	90		300			4		7M	1
TYGART RIVER	HUTTONSVILLE	9	1	62		3							0	0	100		300			4		1M	6
POND FORK COAL R	VAN	4	17	62				4					1	9	90		200			4		3M	-
FLK RIVER WEB	WEBSTER SPRINGS	5	19	62						6			4	1	95		500			4		17M	2
STONECRAK CREEK	WESTON	7	31	62	1								50	10	40		300		2			3M	3
WISCONSIN																							
OCONTO RIVER	OCONTO	8	17	62				4					0	0	100		500		3			1M	2
NASHOTA LAKE	DELAFIELD	4	12	62		2							99	0	1		1,500		2			1M	2
WYOMING																							
DEER CREEK	GLENROCK	4	18	62				4					-				20		3			5M	6
L POPO AGIE RIV	LANDER	11	25	62						6			25	0	75		135			4		1M	-
NOTE: Reports from Delaware and Utah received too late to be included in the tabular analysis.																							